ROLE OF HIGHER EDUCATION INSTITUTION FOR POPULARISING GREEN INITATIVES AT NATIONAL LEVEL

SYNOPSIS

Submitted for registration of

The degree of

DOCTOR OF PHILOSOPHY

DEPARTMENT OF COMMERCE
Submitted by Shivani Jain
Under the guidance of Dr.MiniAmitArrawatia

PREAMBLE

Environmental education has been defined and redefined over the last twenty five years. It is generally agreed that environmental education is a process that creates awareness and understanding of the relationship between humans and their many environments - natural, man-made, cultural and technology. Environmental education is concerned with knowledge, values, attitudes, application and has as its aim responsible environmental behaviour (NEEAC, 1996).

Sustainable development is defined as "*Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs"* (Kateset.al., 2005).

Sustainable development, as a concept, emerged in 1970s along with the development of industrialization. Especially in 1987, with the report entitled "***Our Common Future***" (Brundtland Report, 2002) published by World Commission on Environment and Development, sustainable development concept which has the principle of development without disregarding environment has received a great deal of attention throughout the world. (Ercoskun, 2005).

The concept of sustainable development is an important milestone in environmental theory because it posits how society itself should be organized, and not simply why certain environmental protections should be adopted or how they can be best implemented. This ambitious interpretation is widely shared by business leaders, policy activists, and academics alike. Of course, just how much social and economic change is necessary to achieve sustainability depends upon how "unsustainable" one believes the present to be. Many advocates of the idea clearly believe the present to be quite unsustainable and thus are prepared for radical change (Taylor, 2002).

Green Education in the Higher education sector is expected to transform individual andis combined with the trend of world economy development. **Environmental benefits andsustainability are two characteristics of Green education**. In the green education model,service is expanded as, what kinds of education is provided by organizations (the processof service creation), how such services are transferred to the customers, how will thebenefits be captured by providers around service (value realization). Education servicesare also working towards achieving green and being environmental friendly. Growth orlearning will only take place in an environment which is conducive for development inchildren’s life. Academicians, administrators, students need to incorporate awareness andadoption of

environmentally friendly practices in the learning process. The culture ofconservation has to be an integral part of the curriculum. The tools and techniques alongwith eco-friendly building and equipment have to be used in the teaching-learning process.The future generations should be able to understand and protect natural resources and inthat process protect human health by being environmental initiators. Present research study will focus and analyse the facts and figures that how Higher Education sector in India can transform themselves into GreenEducation in terms of their opportunities and challenges by considering advents intechnology and readiness of the learners. Opportunities to go green, Challenges to gogreen, the consequences of going green, and sustainability of higher education sector bytechnology adoption are also discussed. Thus in this background present research study is focused on the topic "***ROLE OF HIGHER EDUCATIONAL INSTITUTES FOR POPULARISING GREEN INITATIVES AT NATIONAL LEVEL"***

1. INTRODUCTION:

1.1 HIGHER EDUCATION: INTRODUCTION

Education has been a symbol of respect, character and prosperity in our country. We had a unique system of education in the ancient period. Through the tradition of Gurukula,Gurus offered education to the students. Gurukuls offered need based education with the objective to serve the society with skills and wisdom. Society was expected to fund these institutions through donations. Rulers and rich members of society provided funds and supported these Gurukulas to impart education to the aspirants.

Students will be required to be brahmacharis or celibates. The knowledge in these orders was often related to the tasks a section of the society had to perform. The priest classes, the Brahmins, will be imparted knowledge of religion, philosophy, and other ancillary branches while the warrior classes, the Kshatriyas, were trained in the various aspects of warfare. The business classes, the Vaishyas, were taught their trade and the working classes of the Shudras were generally deprived of education privileges.

A number of learning centers became increasingly visible from the period between 500 BCE to 400 CE. The important urban centers of learning were Taxila(in modern day Pakistan) and Nalanda in Bihar, among others. These institutions systematically imparted knowledge and attracted a number of foreign students to study topics such as Vedic and Buddhist literature,

logic, grammar, etc. Chanakya, a Brahmin teacher, was among the most famous teachers of Takshasila, associated with founding of Mauryan Empire.

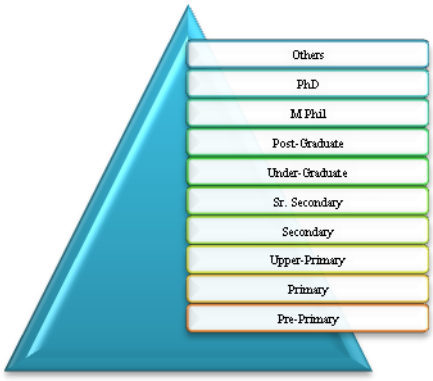
An educated person elevates one's mental status as well as contributes to the society. Education plays a very valuable and important role in bringing out the best qualities in an individual. With its increasing awareness, it is helping individuals in getting good employment, thus helping them live a good life style.

With the increasing growth opportunities coming with the rapidly growing Indian economy, the Indian Higher education is in for a boom. More and more people want to be professionally qualified with higher education qualifications.

Since ancient time period, education has been available to one and all. Special elaborate arrangements were made and students were sent to Ashrams(boarding schools), where they completed education under the guidance of the Guru(teacher). The teaching language was Sanskrit.The students were trained to memorize the learning's, take inferences from the teachings and apply them in real life. Few schools of learning, known for attracting students from India as well as neighboring countries were, the Nalanda University, TaxilaUniversity etc.With the Medieval times, the education system in India started taking a downslide.

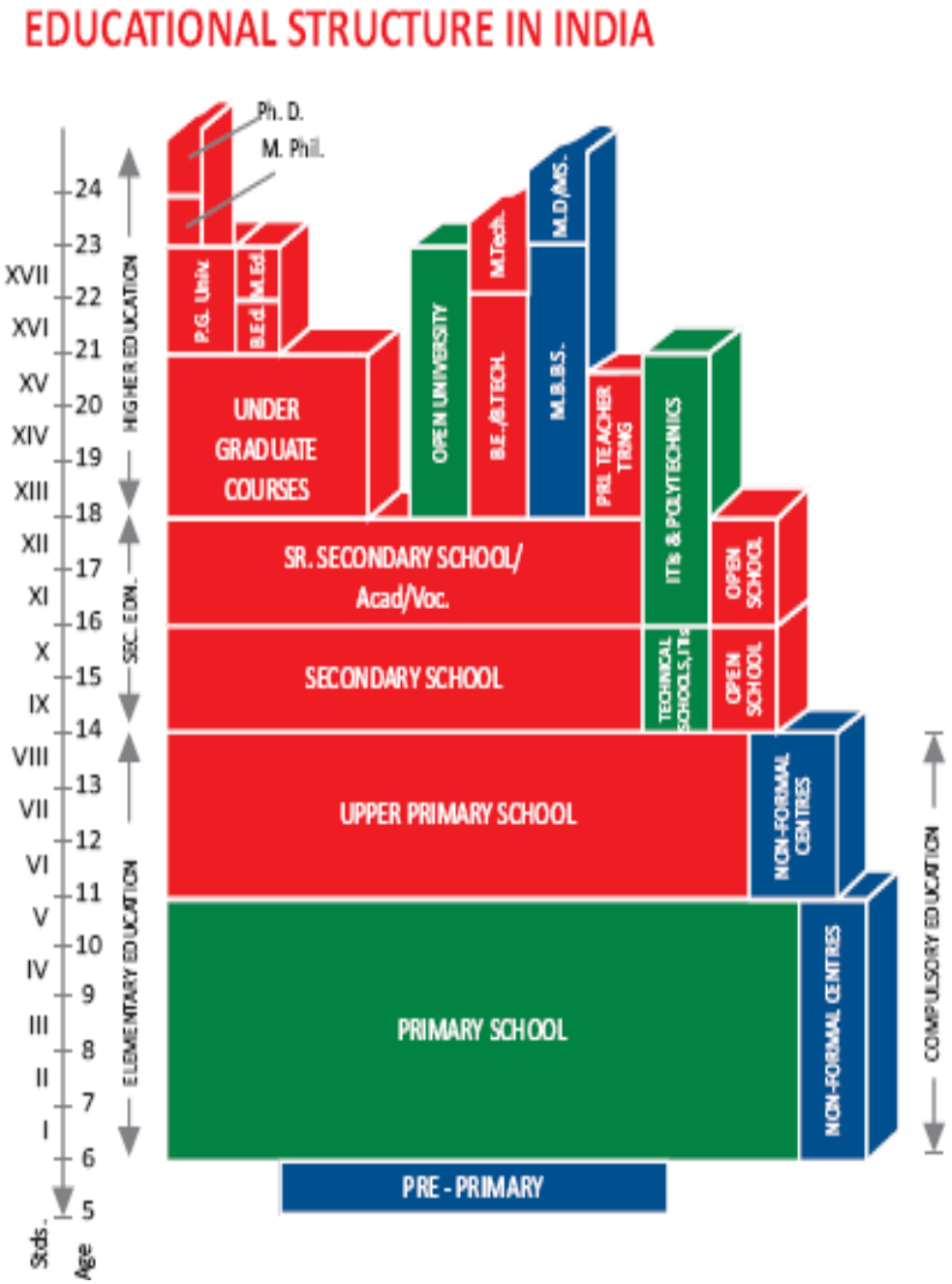
The current education system was initially drafted by the British's in the year 1854 by Mr. Wood Dispatch. It has roots from the British education system, which was brought to India in order to educate and groom the administrative staff in British India offices. The main emphasis was on the use of vernacular languages, in place of Sanskrit. The government aided schools blossomed, further encouraging the private schools, by giving them financial support.

FIGURE 1.1: BASIC STRUCTURE OF EDUCATION



Source: UGC website(http://www.ugc.ac.inin brochure: "Higher Education of India at a Glance" 21st March' 2019)

FIGURE 1.11 : EDUCATIONAL STRUCTURE IN INDIA*



SOURCE= ww.educationindia.com

By higher education we are familiar with under graduation, post- graduation completed at universities, institutes and colleges. It is also known as tertiary education. Knowledge once acquired becomes an asset to an individual. The professional knowledge is acquired by means of many courses and studies at the higher education level, some of them are as follows:

- **Engineering courses**

- **Medical courses**
- **Management courses**
- **Academic Degree courses**
- **Professional courses**

Modern Higher Education System

India's higher education system is the third largest in the world, after China and the United States. The main governing body at the tertiary level is the University Grant Commission (UGC) which enforces its standards, advises the government, and helps coordinate between the center and the state. The 12 autonomous institutions established by the UGC oversee accreditation for higher learning.

The British model influences India‘s education system. Primary and secondary education is of ten years duration, followed by two years of senior secondary education (equivalent to completion of senior high school graduation in the United States). Higher education starts after completion of year twelve and generally requires three years of undergraduate studies to earn the Bachelor of Arts (B.A.), the Bachelor of Science (B.Sc) or the Bachelor of Commerce (B.Com) pass or honors degree. Professional (first) degrees in fields such as agriculture, medicine, engineering, law, dentistry can take between four to five years of study (with six months of additional compulsory internship, where applicable) and other degrees such as Bachelor of Journalism and Mass Communication etc in three years.

The central and most state boards uniformly follow the "10+2+3" pattern of education. The 10 years is further divided into 5 years of primary education and 3years of upper primary, followed by 2 years of high school. This pattern originated from the recommendations of the Education Commission of 1964–66.

Master‘s degrees are generally of two years‘ duration, but some courses like the Master of Computer Application (MCA) may require three years‘ of study. Upon completion of the master‘s program, students complete an additional year or two of study to earn the Master of Philosophy (M.Phil) degree. The Doctor of Philosophy usually involves two or more years of research following the M.Phil.

Recent years have seen the growth of the Postgraduate Diploma, which is earned after the bachelor‘s degree and is more professionally focused and specialized than the Master‘s degree.

These usually require one year of full-time or two years of part-time study upon completion of the first degree. Professional qualifications, which award memberships based on a series of examinations, are also becoming more popular in India.

Today, the professional higher education is most sought after in order to get associated with a good brand, earn decent salary, with a job role befitting to the higher education qualification.

There is a direct relation of higher education level of an individual with the growth and development of the nation. The greater the support of the nation towards raising the average learning and education level, the more would be the individual productivity. Increased productivity would lead to the economic growth of the country, by the way of producing more jobs. Different types of education can lead to the economic growth of a country, though it cannot be said that how and what particular type of education leads to growth.

Most of the world economies are now shifting towards information economies with more flexibility and globalization approach. In recent times the science and technology industries have shown growth, increasing the demand for higher education. The increased and better working opportunities and rewards such as medical benefits, monetary benefits among other benefits, for the highly educated and qualified are a major motivation for seeking higher education. It is always a wise decision to invest in higher education looking at the vast growth opportunities and various benefits associated with higher education jobs.

1.2 GREEN INITATIVES IN HIGHER EDUCATION SYSYTEM

The present environmental issues and facts have created awareness on the kindof impact that it will have on future generations. This has initiated necessity of goinggreen and being sustainable which has created an increased demand for green servicesand products. This undoubtedly is of recent origin where the consumers demand greenservices and products. Going green is important and crucial especially for thedeveloping economies because of its population and natural wastage. It is very crucialto create a sustainable future. This generation of consumers and manufacturers areresponsible for the climate change and the rectification of this mistake can happen if wego green in possibly all sectors. Green concept is used in effective management ofenergy, green management education, green service industries and manyother fields in the society.

Higher education plays a vital role in creating role model citizens of the country.These students need to understand the associations and links between theenvironment, conserving energy, ecology and economy. Higher education has 3objectives namely academic teaching, industrial research and community services.Universities are therefore are forced to create students who will play a crucial role inengaging with the society's problems and provide solutions to those problems.

1.2.1 SUSTAINABILITY IN HIGHER EDUCATION:

The affect of the environmental problems should be the major issues in allcolleges and universities where students are an integral part of it. Green andsustainability are important opportunities for the students when they become a part ofprofessional and labor markets. When higher education goes green it also creates ahigh public image, helps in attracting and retaining the best and committed employeesand having best students who would aspire to be under such colleges and universities.The United Nations had constituted 2005-2014 as the decade for green educationdevelopment. This was done to create a positive impact on the society at large bybringing greenness with sustainability in higher education sector.

A continuous demand exists from the student's side that opts for a career whichis meaningful and unique and which is sustainable. Universities need to bridge this gapby integrating green lessons in existing university and colleges. Research done byNational Wildlife Federation revealed that only 13% of the universities out of 715universities have a course in environmental education. These courses are underutilizedbut it is gaining momentum. Sustainable education has to get the collaboration with theindustry and future industries. Sustainability challenges in the community should beaddressed. Students are to be provided with the opportunity to study and apply theconcepts, methods of applying green in all functional areas of management. If they havean understanding of the issues it will help in future to apply solutions to theorganizations that they join.

Education systems have a responsibility for alternative thinking and creatingnew ideas and challenging the old school of thoughts. This will lead to different thinkingamongst the students and help them in any kind of social interaction. When such aneducation culture is brought in it leads to transformation thinking in society. So thestudents who come out from such a system will be employable graduate who is an assetto the society.

1.2.2 GREEN CONCEPTS IN HIGHER EDUCATION:

Green higher education is all about creating of knowledge, skills, attitudes andvalues related to environment. It's more needed in higher education because of thedependence of environment with the economy. The green economy should be used asthe centre point for understanding the inter links between natural environment and theother environmental forces like political, social and economical. Higher education playsa pivotal role in creating and developing human capital. This resource that is createdshould not just look at economic point of business but societal aspect as well. Thedemands for green jobs are on high. The solar energy and wind energy has to be still beutilized to reach out the masses in an efficient manner which calls for efficient greenmanagers. From the construction industry to all management sector there is a need tocreate sustainable future which means that many green oriented graduates are needed.

The infrastructure has to be in such a way that buildings, energy costs, reliabilityand performance which has a positive impact on the environment. The faculties will bepromoting learning in a conducive environment where they will address local, regionaland national development issues. The systems, processes, structures, procedures anddevices to learn green are eco friendly ways. Green can be used in a large way when it isopen and distance learning. Continuous research on green jobs, green concepts, andpromotion of it in operations management is needed. The college resources should bein a manner of commitment by top administrators, building facilities, faculties whobelieve in green ideology, curriculum that supports philanthropic and interest amongststudents. It is very essential that sustainability be brought into business model. Theenvironment provides typical challenges to the current and future generation in termsof climate change, resources getting depleted, water issues, poverty, food and warissues, environment caused diseases and pollution. This is further accelerated indeveloping countries because of less economic development and high populationexplosion. Initiatives taken from the colleges and universities will help studentsdevelop knowledge, skills and attitudes to fight with these issues.As a university theyhave an important role in reviewing the various courses and degrees and address issueswhich addresses about sustainability. The teachers who are a crucial stake in thissystem have a great role to keep updated and informed and transfer knowledge ininnovative way. The whole methodology of teaching should be learning oriented ratherthan teaching oriented. Pedagogy should include the real world learning experiences sothat the learning is very fruitful.The subjects that can be added in this kind of

systemsare agriculture, organic farming, climate and atmosphere, green tourism, green medicalservices, green transportation etc. In this form people planet and profit will be achievedin all industries.

Green education also includes enhancing student knowledge in using greentechnology. Computer and information technologies are already considered as greentechnologies due to their contribution to clean environment in many industrialautomation process. Green nanotechnology has been described as the developmentof clean technologies, "to minimize potential environmental and human health risksassociated with the manufacture and use of nanotechnology products, and to encouragereplacement of existing products with new nano-products that are moreenvironmentally friendly throughout their lifecycle. Green nanotechnology is the studyof how nanotechnology can benefit the environment, such as by using less energyduring the manufacturing process, the ability to recycle products after use, and usingeco-friendly materials. Table 1 depicts the comparison of conventional educationwith green/sustainable education.

It is well known that we can improve the performance of any system bycomparing it with a hypothetical, predicted system of that kind called "Ideal system". It is found that, by keeping such hypothetical devices or systems in mind,researchers have continuously been improving the characteristics/properties ofpractical devices / systems to upgrade their performances. It is also assumed that idealsystems will consume zero input, zero energy, zero maintenance cost and producesinfinite output. Hence, ideal properties of a device or a system can be used to upgrade orimprove its properties towards reaching 100% efficiency. By comparing theproperties/characteristics of a practical device/system with its ideal counterpart, onecan find out the possible modifications in that device /system towards reaching theobjective of achieving such an ideal system. Ideal systems always sustainablesystems due to the fact that they do not degrade the environment, and hence are greensystems.

TABLE 1: COMPARISON OF CONVENTIONAL EDUCATION WITH GREEN /SUSTAINABLE EDUCATION

S.No	Conventional Education	Green/Sustainable Education
1	Only profit orientation	People, profit and planet orientation
2	Out dated pedagogy	Modern pedagogy
3	Demand for formal graduatesdecreasing	Demand for green jobs are high

4	Traditional approach	Contemporary approach
5	Usage of technology which isoutdated	Green technology is being adopted
6	Environment gets degraded	Environment is upgraded

1.2.3 GREEN MODEL IN HE:

Green higher education has three essential components:

- ✓ Creating awareness amongst the public to achieve sustainability developmentand results if we fail to do so.
- ✓ Concentrating on curriculum of green education by including the currentknowledge and skills required in industry.
- ✓ Appling the green concept in each and every process in industry and society formaintaining sustainability.

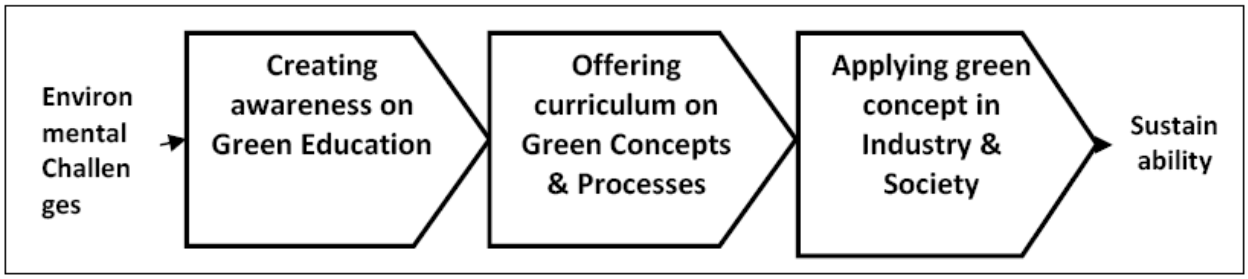

Environ mental Challen ges
Creating awareness on Green Education
Offering curriculum on Green Concepts & Processes
Applying green concept in Industry & Society
Sustain ability

Figure 1: Green Model in Higher Education

1.2.4 GREEN ENVIRONMENTAL SUSTAINABILITY:

Sustainable development highlights the development that fulfills the needs of thepresent generation without compromising the needs of the future generation. Theresources are exhausting at a fast pace which means there's a continuous demand forproducts and services which do not cause burden on the planet. Along with economicdevelopment there is a need for environmental uplifting. Unless environmentalsustainability is achieved sustainable development cannot be achieved. Life style ofpeople should be within the planets ecological setup. Reduce, Recycle, Reuse are thethree terms mostly used by every individuals or corporate or nations.

Role of Science and Technology for Contributing to Environmental Sustainability:

There is a strong notion amongst the intellectuals that the twin objectives ofachieving sustainable development with environmental sustainable can be achievedthrough the use of science and technology. This requires a fundamental shift in people'sattitudes towards nature and environment. This change in attitude can be broughtabout my creating awareness when they are young in educational institutions. Highereducation can play a forefront role in imparting the

environmental values and makingthem equipped about green services and products. Science and technology has touchedevery aspect of modern life.

From the time of industrial revolution economic development has been with theusage of science and technology. Science and technology has numerous benefits. But ithas been targeted for spoiling and degrading the environment. In the present contextscience and technology can be used for understanding the potential environmentalproblem in terms of pollution or ozone depletion. The only solution is to reduce or stopthe CFC emissions and probably through it save the environment for future generation.Through technology the problems can be detected but the solutions have to be lookedbeyond science and technology.

GREEN STRATEGIES:

Strategies of an organization or individual are divided into five types as (1)competitive strategies also called Red ocean strategies (Porter M.E. 1998), (2)monopoly strategy called Blue ocean strategy(Han Kim W. 2006), (3) sustainablestrategy called Green ocean strategy (Hou, Shengtian, 2007), (4) a mix of Blue andGreen called Purple ocean strategy (Babelfish, 2007**)**, (5) unethical strategy for onetime survival calledblack ocean strategy (Aithal P.S 2015) and combined/whiteocean mixed strategies. Some of the strategies to be used in green education areidentified and depicted in fig. 2.

STRATEGY 1: INCORPORATING SUSTAINABLE PRINCIPLES INTO COURSEWORK

- ✓ Interdisciplinary academic courses
- ✓ Subject specific courses
- ✓ Distance learning programs
- ✓ Training in hands-on approach
- ✓ Faculty who are energy experts to main the art of developing tailormade energy systems
- ✓ Skills Certificate program
- ✓ Lab setting and testing ground for green resources

Creating green courses across various departments brings a holistic agreementof opportunities, principles, challenges and answers to sustainable practices. Coteachingcan help in incorporating sustainability if they have not trained background.Green is required in all related fields of planning, organizing irrespective of functionalareas like marketing, finance, operations or human resources. A comparison andanalysis of the traditional practices is being questioned

and new ways of greentechniques are incorporated.An interactive web-based syllabus eases interdisciplinarycommunication amongst professionals, students and society members with extensiveunderstanding of sustainable business practice and reciprocal with the governmentauthorities, professionals, researchers etc. Collaboration with higher educationinstitutions and research experts is a good route to make students understand thepresent demand of all industries.Aligning academic programs and courses with issuinggreen technology industries that have the most eminent job opportunities in developingnations. More and more companies accepting and following green industry principlesand practices.A subject in sustainability increases a study on sustainable products andservices and processes, sustainable building, efficient energy, energy management,marketing and sales for sustainable components, renewable energy etc.

STRATEGY 2: ACQUAINTING GREEN SERVICE LEARNING REQUIREMENTS

Colleges, universities and business and non businessorganisations servicelearning is highly effective strategy. This will leave a positive impact on both the serviceprovider and service receiver. The benefits of sustainability are taught to students. Thisspreads awareness and teaches practical skills for greening the organisations.

STRATEGY 3: ENFORCING EXISTING PROBLEM SOLVING USING GREEN CONCEPT

Students through direct interaction inside or outside classroom learn greeningthrough experience and hands on approach. This provides opportunity to students todevelop problem solving thinking skills. Using internships, research programs,collaborative assignments, out of the classroom teaching, student initiated pedagogy arethe ways of pedagogy.

STRATEGY 4: BRIDGING HIGHER EDUCATION WITH FUTURE EMPLOYERS

Higher education institutions and the future employers should coordinate witheach other so that the demand is gauged for green employees. The skill sets andknowledge required by employees can be understood by the universities so that theteaching can be incorporated. Higher education’s major responsibility is to impartknowledge and skills needed in the workplace. This helps in the creation of greeneconomy. Students skill set has to be aligned with the current industry demands. In thecompetitive market innovative programs are needed by the business houses. Casestudies are incorporated in class room for better understanding of green concepts andprocesses.

STRATEGY 5: LEARNING FROM OTHERS EXPERIENCES

Learning from the best practices from other companies and green countrieshelps in achieving sustainability. Learning from other disciplines like geology, marine,zoology, business helps in green concept of study. This helps in determining complexobjective of achieving pollution control and greening. Co-operation amongst highereducation institutions helps in achieving knowledge sharing and management.Developing and improving metrics to measure effectiveness of green educationalcourses which helps in building and improving curriculum. Academic resources fromtext books, libraries, websites helps in collecting ideas and information. An innovativecurriculum will helps in professional training and decision making.

STRATEGY 6: INCORPORATING AND USING GREEN TECHNOLOGY IN EDUCATION

To aid in greening colleges and universities technology can be of main help.Technology has to be incorporated into the sustainability program across all streams ofhigher education like in operations, research, and student learning and in house andoutreach community programs. Technology will help in designing interactiveworkshops, collaborations between institutions, consulting projects and for promotionof vision of green higher education. Environmental technology education can beincorporated in curriculum development and program improvements. Greentechnology in education helps in building energy technology, energy conservation,efficiency in energy and renewable energies.

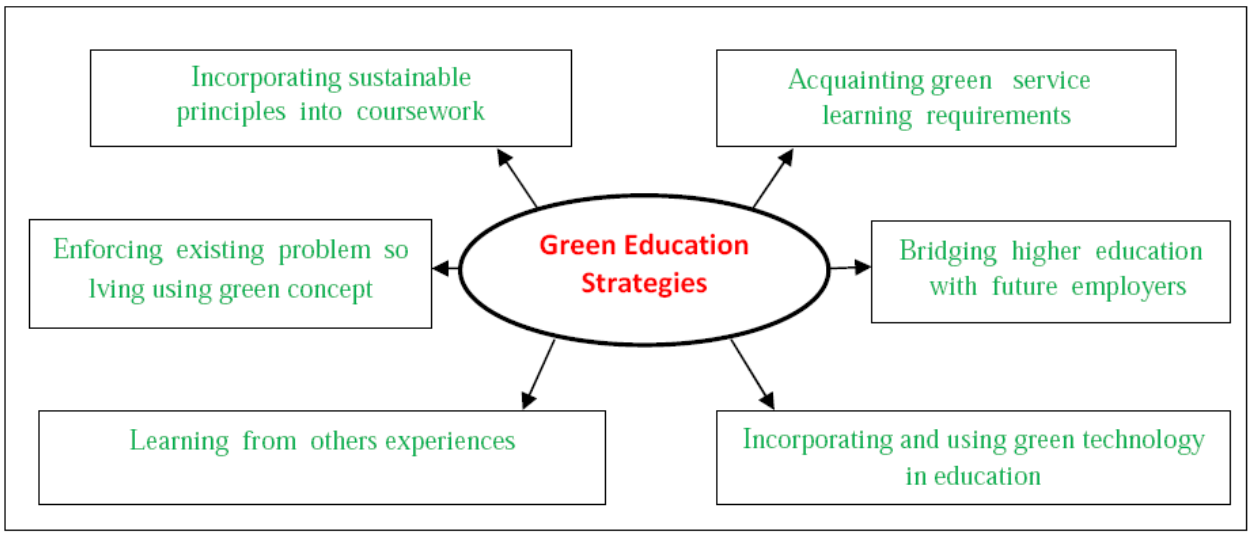

Incorporating sustainable principles into coursework
Acquainting green service learning requirements
Enforcing existing problem so lving using green concept
Green Education Strategies
Bridging higher education with future employers
Learning from others experiences
Incorporating and using green technology in education

Figure 2: Green Education Strategies

2. REVIEW OF RELATED LITERATURE

2.1 STUDIES CONDUCTED IN INDIA

The following were the studies conducted in India;

Indera P. Singh and Tiwari, S.C., 1980.*Man and his Environment*. The Man and environment relationship makes a fascinating area of study. This is so because of man's unique ability to exist in a variety of eco system as well as to adapt him to varying external condition. The environment in which man exists, and to which he adapts himself and he also moulds includes not only the physical aspect but also the socio-cultural and biological aspects. The man-environment relationship is never constant and there are many factors which are responsible for shifts in this relationship. Changes in the members in mankind, growth or decline and the movement of person from one place to another produce constantly shifting relationships between man and the environment. This result changes on the one hand and changes in the structure, as well as the genetic and socio-cultural characteristics of population on the other. Apart from genetic and biological responses to different environmental condition, man as a cultural animal has with the use of technology, manipulated the environment in order to satisfy his desires and needs. Man interactions with his environment have been undergoing change and adaption continuously in many parts of the world. Thus, culture has made man mechanism of adaption even more specialized than psychological tools.

Ganguli, D., Vashishtha, U.C.V., 1980. *A Trend Report Environmental Educational Research in Science Education.* The study of environment by researchers in science education is quite a late phenomenon in the history of Indian education. Study related to environment falling two categories. For some, environment has relevance as the approached to learning. While for other, it is important for its content as a subject of itself. The first study in this line was done by Escemmal (1980) when teaching through different models, the environmental approach was tested for its efficacy. The results were very encouraging. The environmental approach was found to be superior to the formal approach. Beside this unique finding was that the students of rural and low SES groups were significantly better in forfeiting from such instruction than their counter parts in urban areas and coming from high SES.

Das, B.C., 1980. *Population, Food, Energy, Environment, Science and Technology.A hopeful strategy for reduction of poverty*. Development through science and technology, commensurate with environmental resources is an ideal goal for all societies. Development is a

fairly comprehensive concept and stands for industrial, agricultural, and economic growth. Development means not only growth; it covers a broad spectrum of people's education, health, nutrition, organization, discipline and honest labor.

Population, food, energy, environment, science and technology are interdependent in these areas and the incompatibility of limitless growth is proving to be an important subject of analysis. Past experience, present condition and feature prospects in the field of energy. Environment, population, organization and food should be carefully analyzed before adopting or embracing a plan of development.

We must differentiate between science and technology. The aim of science is to understand nature and related thing. The aim of technology is to produce goods and services to meet present and potential human needs. Science is universal and is judged by its penetration in to the mysteries of nature. Technology is culture is specific and is judge by its contribution to the society.

Ghose, GauriRani, 1988.*Know the plants around you.Independent study*. It is an attempt to advocate not to stuff the mind of the children with facts and information, but to sharpen their senses to enable them to observe their environment and to enrich their experience. Development of a handbook of plants, containing stories and myths associated with the plants, information about the usefulness of the plants. Seventy common plants associated with everyday life were selected and listed and a handy key to the families of these plants, with their floral diagrams was developed.

The report provided a list of 70 common plants with a standardized method of describing them in non-technical and semi-technical language. As examples, descriptions of Bael (AegleMamrmelos), Coconuts (CocosNucifera) and Nymphaea (Water Lily) were given as technical aids, so herbarium sheets were prepared [SRA1118].

Khattar, N., 1988. *Systematic studies of fauna in and around Bhubaneswar for development of a museum*. The study attempts to develop a systematic account and a museum of the fauna of the local area and surrounding. To make the students and teachers curious to know and collect the fauna of their immediate environment and to help them find out what animals exist in their surrounding and how these differ in different localities.A thorough survey was conducted to collect the fauna from their territorial, fresh water, barkish-water, and marine environs. Different types of sampling methods were employed in different environs. The

identification and classification of different animals collected under the project was done and lists were prepared to identify specimens from different groups such as Porifera, Coelenterata, Helminthus, Arthropoda,(Arthropoda- insects and butterflies) and the different families of fish , reptiles, birds, mammals etc. [SRA1115].

Sharma, Munishwarkumar, 1990. A *study of scientific literacy, attitudes towards science and personality traits of students and teachers.*This study investigates the of science literacy, attitudes towards science and personality traits of certain groups of students and teachers. The objectives of the study were to study the level of scientific literacy of different groups of students and teachers, to study attitudes of science of different groups of students and teachers, to study personality traits of students and teachers.

The study sample comprised science students and teachers. The tools used in the study included scientific literacy scale, attitudes to science scale and cattells 16 personality factors questionnaire. The total had higher level of scientific literacy than theoretical mean. There was significant difference between the general group and the ST/SC groups. The total sample had favorable attitude towards science. There was no Significant difference between students and teachers personality factors.[JKSO696]

Shahmawaj, 1990.*Environmental awareness and environmental attitude of secondary and higher secondary school teachers and students towards the environment.*This study address issues related to the awareness and attitudes of teachers and students towards the environment. To determine the extent of awareness about the environment among the students and teachers, to find out the attitude of teachers towards the environment, and To find out the differences between teachers and students and male and female groups concerning the environment. The study was conducted mainly through a survey and the application of a tool developed by the investigator to test attitudes and awareness. It was found that 95 teachers and 945 students possessed positive environmental attitudes. The environmental trained teachers and trained teachers did not differ in their attitudes. Girls possessed significantly more awareness of environment than boys.[JKSO698].

Kidwari, Zeenat, 1991. *Development of an environmentally – oriented curriculum in Geography at secondary Stage*. This study addresses the problem of environmental education for protection and conservation of the environment the objectives of this study were: to involve an integrated environmental education and bring about an overall awareness among younger

generation about environmental education, to developed active and well informed individual for protecting and conserving environment, to develop in individual and communities skills for identifying and solving environment problems. Development of the geography and curriculum has been attempted on the ecosystem concept, dividing the environmental components into\lithosphere, hydrosphere and biota (Including the human population). A frame work for an environmentally oriental geography curriculum at secondary stage was presented. [MPRISO9]

Phaharaj, B., 1991. *Environmental knowledge, environmental attitude and protection regarding environmental education among pre-service and in-service secondary school teachers*. This study attempts to explore the level of environmental knowledge, attitude and its perception among pre-service and in- service secondary school teachers. To find out the level of environmental knowledge and attitude of pre-service and in- service secondary school teachers and to study their perception regarding environmental education in the secondary school. The level of environmental knowledge was found low among pre-service teachers although conceptual knowledge was moderate. Among the in-service teachers environmental knowledge is moderate and factual knowledge about environment was low. Teachers perceived that environmental education could be core part of social science subjects in secondary school as well as mass media have a potential role to play in interpreting environmental education. [MSYO929].

GopalKhrishnan, Sarojini, 1992.*Impact of Environmental Education on Primary School Children.* The study addresses the problems of environmental education and its impact on primary school children of standard – v selected at random schools of the Nilgiris, Madras and Coimbatore. The objectives were: To identify the important factors of the environment, to assess the impact of environmental education test. To find out through a small experimental study, the impact of the participatory learning approach. The distribution of the total environmental education scores of the entire sample approached the normal form which implies that studying environmental education had a very good impact on the children. The study showed that the participatory learning approach could bring about a better impact. Teachers, in general, felt that there was not sufficient time to give importance to learnercentered activities. (MCISST)

Sahoo, K.C., 1992.*A critical study of the conception and perception of environment education.* There is a lack of understanding about the constituents of the environment and their relationship with man. The present study attempts to renovate the concept of environmental

education. The objectives of this study were to: To study the concept and constituents of environment, to study environment-man relationship, to study the dynamics of the environment, to renovate the concept of environmental education. The concept of the environment is broadly divided as natural and man-made types. Flora and fauna constitute the biotic environment. The atmosphere, hydrosphere constitutes the biotic environment. Man-made environment are of different types, such as social, economic, political, cultural aesthetic, historical geography, psychological, religious and academic. Several workshops, committee and bodies at national and international levels have thrown light on the conceptual analysis of environmental education. Environmental education is a broad concept and is perceived as life- long experienced for all. [PKSO645]

Agrawal, S.P., Agrawal, J.C., Prithvish Nag, 1996. *Environment Protection and Policies in India*. The problems encountered in the field of environment in India arise on account of poverty and under- development. Developmental activities lost sight of environmental and ecological imperatives. The damage done to the environment due to the growth in population and developmental activities, calls for urgent remedial measures. Environmental management is now accepted as a major guiding factor for national development in India. Over the last decade there has been a progressive strengthening of official involvement in environmental management with increased scientific, technical, administrative, and legislative back-up at the central and state levels. In the beginning of fourth plan, problems related to environment received the government attention. A committee on environmental coordination was setup in 1972 to look into the problems and suggest solution in consultation with the experts and concerned ministries /department of the government.

Aggrawal, S.P., Aggrawal, J.C., 1996,*Climate Change and Environmental Issues*. The whole issue of climate change is centered on the generally expected global warming which has been confirmed by the intergovernmental panel on climate change (IPCC) in its final report, published in august 1990. This predicted that without actions to reduce emissions, global warming will reach 2-50 C over the next century, a rate of change unprecedented in the past 10,000 years. The reason for this warming is the build-up of certain gases in the atmosphere which form a blanket around the earth, trapping much of the radiation from the earth which would otherwise escape into space. This is known as the Green House effect, and the gases are referred to as green house gases.

In context of climate change, carbon dioxide (CO2) is the most important of the green house gases, the other been chlorofluorocarbons (CFC5), methane, nitrous oxide and ozone. Carbon dioxide occurs naturally and is vital to life processes. It is absorbed by green plants and converted into carbohydrate by photosynthesis and it is release during the process of natural decay and by burning. The amount of carbon dioxide in the atmosphere has been increasing mainly due to industrialization and the burning of coal, oil and gas (fossil fuels).

Agrawal, S.P., Aggrawal, J.C., 1996, Indian Institutional base for environmental education, (selected profiles), Centre for environment education, Ahmedabad, 380054, India. The Centre for Environment Education (CEE) is a National Institute supported by the Department of Environment, Forests and Wildlife Government of India. At the national level its functions are: to help national net works for environmental education and to work with the existing net works both for the purpose of development and trial which can be a simultaneous process, to use both modern and traditional media and to experiment with innovative communication ideas for the promotion of environmental awareness, to develop educational material intended for widespread use in a way in which the user can adopt it to particular situations. In this sense, to develop the material more in the form of a tool rather than a finished product and to use existing situations and develop interpretive program around them. Fresh water is in the form of permanent ice and deep underground water which is at present un-exploitable. So the amount available for human use is even more limited. The process of converting sea water to fresh water by desalination is used by some countries, but it is expensive and only really practicable where there are large supplies of cheap energy.

Agrawal, S.P., Aggrawal, J.C., 1996, *Environmental Awareness and Status*. Awareness of the physical environment is not, by any means, something recent. Man, ever since he appeared on earth, became a part of his environs. Primitive man, when he had time to look around, observed nature in all her pristine beauty, splendor made him joyous and mystery kindled awe and curiosity. This is how the wonderful synthesis of the physical world with the individual soul began.

The environment includes animals and plants and their ecological systems which are closely bound to the livelihood of people. Whatever is present around the living beings and above the land, on the surface of the earth and under the earth is environment in its broader sense. Environment covers all outside factors that have acted on the individual since life began

life. Better life is dependent upon both the types of environment, i.e., natural (physical) as well as social environment. While natural environment is generally emphasized, social environment in life is not adequately stressed. Social environment also concerned with clean administration and clean politics. True education can play an important role in promoting higher values of life, but task does not seem to be an easy one when there is all round deterioration of moral standards. The need of the hour is that leaders and specially those who hold power should set good example.

Agrawal, S.P., Aggarwal, J.C., 1996. *Environment and Forests in India*. The ministry of environment and forests serves as the focal point in the administrative structure of the Central government for planning, promotion and co-ordination of environmental and forestry programs.The main activities include protection of environment, prevention and control of pollutions; conservation and survey of flora, fauna, forests and wildlife; and afforestation and regeneration of degraded areas.These tasks are being fulfilled through environmental impact assessment; eco-regeneration; assistance to organizations implementations environmental and forestry research, extension, education and training to argument the requisite manpower; dissemination of environmental information; international co-operation and creation of environmental awareness at national level.

Agwarwal, S.P., Aggawal, J.C., 1996. *Consumption Patterns, Environment and Sustainable Development.*The high rate of natural resource and energy consumption and waste generation in develop countries is rapidly becoming one of the most controversial topics in the current international development. Resource consumption and the associated pollution are at their highest levels ever worldwide. The issue of consumption raises three basic points relevant to environment and sustainable development; Consumption is a root cause of environmental damage worldwide; It highlights inequity between North and South in economic strength and resource availability; It reveals a worldwide failure to value and account for natural resources.
Excessive consumption of resources has a number of environmental consequences. It threatens biological diversity by causing species depletion and habitat degradation through over exploitation. Forests are felled and seas over fished because of consumer demands for timber, food, rubber, pharmaceutical and other items. In agriculture sector, use of too much fertilizer and too many pesticides destroy biodiversity and lead to pollution. The rise of the consumer society

also affects local people and their traditions, compelling many to abandon their age-old way of living in favor of a more consumer-oriented life style.

2.2 STUDIES CONDUCTED IN ABROAD

The following are the studies conducted in abroad;

Kelly, Christine, M., 1996.*Understanding our sensitivity to the natural environment*.*An initial theory of the nature of environmental responsiveness*. This study explore the nature of environmental responsiveness (i,e, one's sensitivity or reply to the natural environment) by identifying the casual contributions individuals make to their personal environmental beliefs and responses which act as determinants of the nature of their environmental responsiveness. Data was gathered from participant enrolled in a master level elementary methods course using; reflective journals; electronic mail communications; tape recorded interviews; courses generated artifacts. As the participant define their environmental beliefs and responses as pro-or-anti environmental areas superficial or satisfactory; their ability and effort to address environmental issues ; their perceive control over changing that which they contributed to the causes of environmental values are formulated to match their personal self-concepts.

Kebey, Jason, 1996. *Effect of residence time and environmental properties on the bioavailability and extractability of organic compounds in soil*.Phenanthrene, Naphthalene and Trazine that had been previously added to sterile soil became progressively unavailable for uptake by earth warms and for mineralization by bacteria with persistence of compounds. The availability of 2,4-dichoro ophenoxyacetic acid the bacteria was similarly diminished with aging of the compound in soil.

These data suggest that bio-availability of persistent compounds in soil declines with time and that predictions of exposure that are based the total amount of chemical extracted from soil do not appropriately estimate exposure or risk to susceptible populations. The effect of environmental properties on extractability of atrazine decreased with melting and drying but mineralization must unaffected. Thus predictions of bio-availability to be consider the effects of these environmental variables.

Berkely, 1996.*Achieving Public Health goals at hazardous waste sites: uses and limitation of risk assessment in a community context, Kyle, Amy, Dale*. The Comprehensive Environment Response, Compensation and Liability Act authorized a federal hazardous waste site assessment and clean up programs implement methods, while Agency for Toxic Substances

and Disease Registry (ATSDR) uses a qualitative approach that integrated health outcome data and community health concerns.

Consideration of community health concerns did lead to identification of localized exposures that were significant in some communities consideration of health outcome data did not result in significant findings. Better co-ordination of site investigation of specialized exposures would improve the process.

Ahn, Hyung-ki, 1996.*Technological risk and the citizens movement towards environmental protection*. Application of collective action theories, this dissertation was designed to examine the nature of citizens response to the technological risk event and movement towards environmental protection objective of this study was to test collective action theories, (Example, Resources mobilization theory, relative deprivation theory, rational choice theory, and the theory of planned behavior) by examining causal association between variables suggested in the literature. The other objective was to integrate a broad array of concepts and variables relevant to attitudes and behaviors in casual context in order to stimulate academic progress in this area.

Finding sheds light on the future studies of collective activism with respect of environmental problems. Researchers should employed multi-disciplinary approaches to kook at casual relationships among variables. Policy makers dealing with environmental problems should be able to address psychological demographic and structural concerns. Environmental policies should be flexible and understood as ongoing process. This provides residents opportunities to participate in the policy process, eliciting public support.

James, E., 1996. An *assessment of attitudes, knowledge and beliefs of global warming. A comparison between twelfth grade students in Lansing, Michigan and Valdosta, Georgia, Fason*.The purpose of this study was to compare environmental attitudes, knowledge and belief held by two regional separated populations. More specifically, the objectives of the study were; to study assess the attitudes twelfth grade students hold towards environmental issues; to assess how much knowledgeable twelfth grade students are about global warming.

The quantitative and qualitative data of this study also found the respondents to lack of knowledge of general issues and global warming. The finding of the study have implications for environmental education, students, secondary school teachers, parents and decision makers.

Agrawal, S.P., Aggarawal, J.C., 1996. *United Nations Environment Program*. United Nation Environment Program (UNEP), as the environment conscience of the UN, conceived at the 1972, Stockholm conference and created at the same year, has its primary function to motivate and inspire, to raise level of environmental action and awareness at all levels of society worldwide. It co-ordinates the environmental activities of all the UN agencies and works to win the cooperation and participation of governments; the international scientific and professional communities and non-government organizations.

UNEP activities include a program of global environment quality monitoring, an environmental management action plan and support measures comprising environmental law, public information and education and training. UNEP remarkable international servicesincluding the Global Environment Monitoring System(GEMS), the International Register of Potentially Toxic Chemicals (IRPTC), and the Worldwide

Information Network of Infoterra – provide both the international community and individual countries and organizations with the vital information they need to decide on action. GEMS furnishes a rigorous scientific basis for environmental management by providing reliable information from its Global Monitoring Networks by catalyzing new stations and vital areas of environmental including climate and atmosphere oceans, terrestrial renewable resources, trans boundary, pollution and the health consequences of pollution. There are GEMS activities in 142 countries.

Agarwal, S.P., Aggrawal, J.C., 1996. *International concern for Environment*. A review on the world political map of environment was first put in the shape of the Stockholm UN Conference on the human environment, an outcome of which was the setting up of the UN environment program (UNEP), other include Food and Agriculture Organization (FAO), such has committees on environment- related issues such as raw materials, agriculture and food security.

The International Labor Offices (ILO) works for protection and improvement of the working environment which is an integral part of the human environment. UNESCO has an interdisciplinary research program. ‘Man and the biosphere’, which despite its sexist title has quite a wide reach in the field of environment education. The UN General Assembly has held a number of Thematic Conferences and adopted a wide range of resolutions on environmental issues. These include resolution on energy, deforestation and international cooperation in the

field of environment. More recently, resolution on protection of the ozone layer and traffic in toxic waste have been adopted.

David, Micheal Dean, 1997. *Industrial Organophosphates: Soil extraction accelerated hydrolysis and environmental presence.* As a class of chemicals, organophosphate estrus (OPS) are of great environmental importance due to their wide spread agriculture and industrial use and release. The vast majority of the environmental fate and analytical method development studies published for DPS have concentrated on the pesticides of this chemical class, primarily due to their activity as acetyl cholinesterase inhibitors. Their presence in the environment therefore, represents an uncharacterized threat to ecological and human health. The studies in this dissertation represent development of several new analytical methods for TAPS, including modern soil, extraction techniques, chromatographic methods and mass spectra. Also the first recorded study of the environmental distribution of these TAPS at Air Force bases due to their release from flame-retardant hydrant hydraulic fluids is reported.

Kearney, Anne Regina, 1997. *Some Implication of cognitive maps theory for Environmental Problem Solving and Decision making*. A fundamental contention of this perspective is that cognitive maps influence how new information, problems and situations are perceived, processed, and interpreted. Further, perceptions are assumed to both guide and limit problem solving and decision making behavior. In essence, the argument is that cognitive maps bias one's way of seeing which, in turn, is a powerful determinant of ours way of thinking and behavior.

The intent of this collection is; to offer a conceptual framework, bases on the cognitive map concepts, for understanding environmental problem solving and decision making. To provide new methodology- the conceptual content cognitive maps (3CM) method for measuring and exploring people existing knowledge structure.

Franklin Edward Albert, 2000.*An evaluation of the California Forestry Institute for Teacher*. The purpose of this study was to evaluate the California Forestry Institute for teachers (FIT) environmental education workshop. As a result of attending FIT, number of outdoor activities increased number of environmentally related field trips increased and the number of lesson in cooperating environmental education topics participants were satisfied with structure of the workshop format and recommended on changes.

No significant differences were found in environmental attitudes between groups although females scored higher than males. No correlation was found between knowledge and attitudes assessment scores. Forest Institute for Teacher (FIT) Participants integrates Environmental Education (EE) into curriculum for a number of reasons.

Sikinyi, 2003.*The role of the bio sciences and biotechnology in agricultural education in the secondary school agriculture curriculum as perceived by agriculture educators*. The purpose of this study was to identify perception of agriculture teachers regarding the role of bio-science / bio-technology in the study of agriculture study sought to determine the degree to which teachers perceived the importance of infusing bio-science/bio-technology in the agriculture curriculum.

2.3 RESEARCH GAP

Findings indicated there is a need to rethink among the universities in their curriculum designing.Topics have to be diverse, materials may not be available, but it has to be created anddeveloped especially for the 21stcentury, not just teach the existing data and facts. Acutting edge thinking which breaks the current knowledge format and theories and newthinking is the need of the hour. The current routine structures and practices should bebroken which will be an era of transformation in social learning, a learning where thereal problems and issues are picked and studied. A curriculum that fits all individuals ofall streams so that they can be involved in problem solving that helps people and theplanet. Instilling education in young graduates and post graduates to build theirprofessional careers as decision makers in green education will be the game changer.Conventional education is no longer adequate in current times.

Therefore present research study is confined to illustrate the study on "**ROLE OF HIGHER EDUCATIONAL INSTITUTES FOR POPULARISING GREEN INITATIVES AT NATIONAL LEVEL"**

3. RESEARCH OBJECTIVES

The major Objectives of this action research are to foster the acquisition and transfer of knowledge, skills and attributes concerning the Role of Higher education for popularizing Green Initiatives such as environment and sustainable development at the national level and to monitor their efficacy in selected regions of India. The specific objectives are to:

- Asses the status of Green Initiatives implemented in Higher educational Initiatives adopted in India.
- To study the impact of Green Initiatives implemented by Higher educational Initiatives on Students.
- To study the impact of Green Initiatives implemented by Higher educational Initiatives on Parents.
- To study the impact of Green Initiatives implemented by Higher educational Initiatives on Society.
- Assess the student‘s knowledge, behavioural attitudes, and actions towards environmental problems, issues, conservation and protection of biodiversity/vital natural resources-especially air and water, besides solid waste management
- To investigate the changes in student‘s knowledge, attitude, behaviour and skills before and after the EESD interventions among the higher educational students
- Investigate the environmental education awareness of higher educational teachers.
- Analyze the magnitude of environmental literacy presented in Higher educational institutes and to compare them with national missions of environmental literacy.
- To suggest Dimensions for popularizing Green Initiatives in Higher educational institutes.

4. RESEARCH HYPOTHESIS

CENTRAL HYPOTHESIS

Null Hypothesis:

Ho: There is no significant role of higher educational institutes for popularising green initiatives at national level.

Alternate Hypothesis

H_1: There is a significant role of higher educational institutes for popularising green initiatives at national level

Secondary Hypothesis

Hypothesis 1:

Null Hypothesis:

Ho: There is no significant impact of Green Initiatives implemented by Higher educational Initiatives on Students.

Alternate Hypothesis

H_1: There is a significant impact of Green Initiatives implemented by Higher educational Initiatives on Students.

Hypothesis 2:

Null Hypothesis:

Ho: There is no significant impact of Green Initiatives implemented by Higher educational Initiatives on Parents.

Alternate Hypothesis

H_1: There is a significant impact of Green Initiatives implemented by Higher educational Initiatives on Parents.

Hypothesis 3:

Null Hypothesis:

Ho: There is no significant impact of Green Initiatives implemented by Higher educational Initiatives on Society.

Alternate Hypothesis

H_1: There is a significant impact of Green Initiatives implemented by Higher educational Initiatives on Society.

4. RESEARCH METHODOLOGY

In the present study, the effectiveness of the active EESD teaching learning approach is evaluated through a meticulous experimental design. The aim of the active EESD approach is to provide the necessary exposure to knowledge, attitudes, behaviour and skills, through examples of facts, processes, interactions and applications on environment and sustainable development. Thus, the active EESD approaches include a combination of theoretical and empirical methods.

RESEARCH DESIGN

In the present study, pre and post test experimental method will be used as suggested by several workers such as Kerlinder, (1973), Dugard&Toldman, (1995), Karasar (2005), in order to

evaluate the differences between the students who will be facilitated by active EESD instructional strategy in the experimental group by the researcher and the control group students, who receive conventional teaching strategy by their regular teachers, over the same period of time.

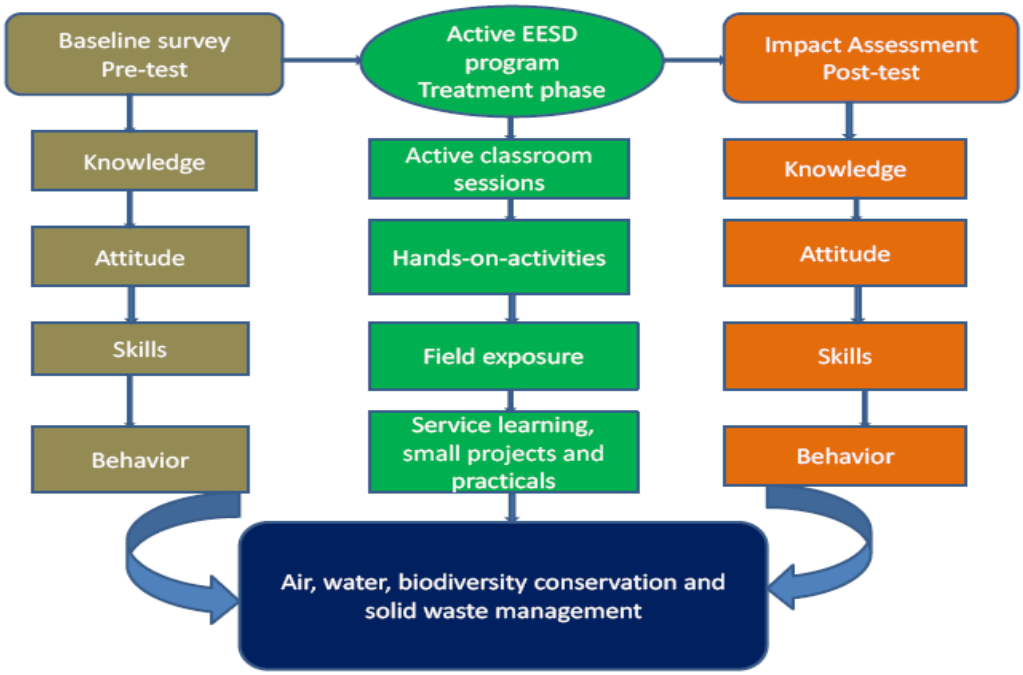


Figure 3.schematic diagram of pre/ post test design for EESD modules

SAMPLE SIZE: 1000 Higher educational Students from all four regions of India

250 = North India

250 = South India

250 = East India

250 = West India

Tools and techniques

Instructional Strategies

A variety of instructional strategies and experiential approaches will be used in active environmental education for facilitating sustainable development. These include classroom sessions, practical, active-learning and creative drama and small projects. Actual strategies employed were (as suggested by Stone, 2007):

- Outdoor adventures and experiences
- Educational camping
- Field trips
- Fieldwork
- Wilderness trails and nature walks
- Experiments.

Inquiry-based learning, activities and laboratories provide students with opportunities to collect, analyze, interpret and present data. Students can also identify and prioritize factors, make predictions and test hypotheses, and construct graphs and charts (Stone, 2007) In addition , a variety of instructional strategies will be also adapted that included- documentary film shows, case studies, classroom debates, group presentations, simulation games, drama and small projects as suggested by Heyman (1982), Gifford (2002) Proulx, (2004). (Table 3)

Through the storytelling contest, students will be asked to express their ideas about the environmental issues, as well as to formulate their vision for the future of the city and air and water quality status besides biodiversity as well as solid waste issues. Through this procedure, Students shared their opinions and shaped a common pool of ideas.

Table 3 Instructional strategies for implementing EESD program

Techniques	Purpose
Hands-on activities	Involve learners working with and manipulating materials to explore a concept for solving problems.
Story telling	Transmit knowledge through an oral tradition and allows audience to experience the emotions and environment of characters in the story
Role- playing	Assign learners to specific roles in a scenario to act out the situation and gain new perspectives, and problem solving skills
Contests	Provide incentives for environmental action or involvement to raise public awareness of an environmental issue, resource, or organization.
Field trips	Provide first hand experiences for participants with a physical site and resources in a community
Games	Demonstrate and teach environmental concepts through fun but structured play, involving elements such as challenge, collaboration, movement, and quiet concentration.
Drama	Develop students‘ understanding of basic environmental and ecological concepts.

Analysis of the Data

In this study, standard statistical techniques such as mean (X), standard deviation (Std. DEV), t-test, and ANOVA will be used in the analysis of the data. P value was held as 0.05. Significance level will be decided by taking p values into consideration. The statistical analyses will be made by means of SPSS 16.0 statistical package programme for windows.

Paired-sample two-tailed t-tests will be used to compare pre- test and post- test means for each question on the content to test the students knowledge, skills, attitudes, behaviour on air, water, biodiversity conservation and solid waste management.

Mean pre- and post- test scores will be evaluated for the student‘s assessment category such as knowledge, attitude, behaviour and skill. Mean score was calculated from Likert-style (Brian E Hagenbuch, 2009) scale responses by adding scale responses into an index for environmental knowledge, attitude, behaviour and skills and then calculating the mean.

The data obtained from the teacher‘s survey will be statistically analyzed using frequency distributions and one-way analysis of variance (ANOVA). This analysis was conducted using independent variables such as gender, school location (rural/urban) and nature of college management (private/government origin) and dependent variables based on the five environmental literacy components of the questionnaire (knowledge, attitude, teaching skills, teaching approaches and barriers)

For analysing the data, mean average, standard deviation, percentage, ANOVAs, t- test, correlations will be computed for drawing the conclusions. For performing inferential statistics confidence level was set at 95%.

BIBLIOGRAPHY

1. Agrawal, J.C., : Environmental Protection, Education and Development: New Concepts, D. Prithvish Nag, New Delhi-110015,1996.
2. Azjen, Icek and Fishbein, Martin, : Attitude - behaviour relations: A theoretical analysis and review of empirical research. Psychological Bulletin. 1977.
3. Arbuthnot, J. , : The roles of attitudinal and personality variables in the prediction of environmental behaviour and knowledge. 1997.
4. Aggrawal, J.C., Education, Part-I, : Documentation Encyclopedia of UNESCO and Aggrawal,S.P., Concept Publishing Company, New Delhi-110059.
5. Axelord, L.J., and Lehman,D.R., : Responding to environmental concern: What factors guide individual action? Journal of Environmental Psychology.
6. Bhagabati, A.K., Kalita, M.C., and Baruah, H., : Bio-Diversity of Assam, Status Strategy and Action Plan for Conservation, EBH Publishers, 136, MLN, Road, Panbazar, Guwahati-7981001.
7. Berger, Ida, : The relationship Between Environmental Attitudes andBehaviour. Canadian Journal of Marketing Research. 1993.
8. Beatty, A., : Climate Change Education, Washington, D.C.. The National Academies Press. 2012.
9. Barker, K.,Fong, L., Grossmam, S., Quin, C., Reid, R., : Comparison of self- reported recycling attitudes and behaviour with actual behavior. Psycological Report. and 1994.
10. Bharucha., : Text Book of Environmental Studies for Undergraduate Course, UGC, Universities press Of India, Pvt.Ltd., 3-5-819, Hyderguda, Hyderabad, 500029, 2006.
11. Buch, M.B., : Third Survey of Reseach in Education (1978-1983), NCERT, Bahadur Shah ZafarMargh, New Delhi-110002, 1988.
12. Buch, M.B., : Fourth Survey of Research in Education (1983-88), Volume-01, NCERT, Bahadur Shah , ZafarMargh, New Delhi-110002, B-27, Sector-7,Noida-UPO, 1991.
13. Buch, M.B., : Fourth Survey of Research in Education, Volume-02, NCERT, Bahadur Shah Zafar Margh, New Delhi-110002, 1991.

14. Buch,M.B., : Fifth Survey of Research in Education, Volume-01, NCERT, Bhadur Shah ZafarMargh, New Delhi-110002, 1998.
15. Buch, M.B., : Fifth Survey of Research in Education, Volume-02, NCERT, Bhahadur Shah ZafarMarg, New Delhi-110002, 2000.
16. Devi, Uma, D., Dr. Reddy, Adivayana., : Environmental Education For Rural Population, Discover Publishing House, New Delhi-110002.
17. DuttaAbhijit, DuttaSunita, and Pandy, D.P., : Environment Issues and Challenges, A.P.H., Publishing Corperation-5, Ansori Road, Oarya Ganj,New Delhi-110002.
18. Dissertation Abstract International., : B-The Science and Engineering, Volume-58, Number-02, August, 1997, ISSNO419-4217.
19. Dissertation Abstract International., : B-The Science and Engineering, Volume-58, Number-04, October, 1917, ISSNO419-4217.
20. Dissertation Abstract International., : B-The Sciences and Engineering, Volume-57, Number-07, January, 1997, ISSN0419-4217.
21. Dissertation Abstracts International., : B-The Sciences and Engineering, Volume-57, Number-09, March, 1997, ISSN0419-4217.
22. Dissertation Abstracts International., : B-The Sciences and Engineering, Volume-57, Number-10, April, 1997, ISSN0419-4217.
23. Dissertation Abstracts International., : B-The Sciences and Engineering, Volume-57, Number-08, February, 1997, ISSN0419-4217.
24. Dissertation Abstracts International., : B-The Sciences and Engineering, Volume-64, Number-06, December, 2003, ISSN0419-4209.
25. Dissertation Abstracts International., : B-The Sciences and Engineering, Volume-64, Number-03, September, 2003, ISSNO419-4209.
26. DeshBandhu., : Environmental Education,(Selected papers Held at Indian National Science Academy, New Delhi during June 5-7, 1980) Indian Environmental Society.
27. Directorate of School : A Healthy Environment is a Healthy Living, Education, Agriculture and Environment Section. Teacher Manual, 2009.
28. Dunlop, Riley, E., and Scare,. : The Polls – Poll Trends: Environmental Problems and Protections. Public Opinion Quarterly, Winter. 1991.
29 Dispot, R.G., : Interrelationships among measures of environmental activity, emotionality and knowledge. Educational and Psychological Measurement. 1977.
30 Directorate of Economics : Hand Book of Nagaland and Statistics Government of Nagaland.2004.
31 Fridgen, C., : Human disposition towards hazards testing the environmental appraisal inventory. Journal of Environmental Psychology. 1994.

32	Gruenwald, D.A.,	:	A Foucauldian analysis of environmental education: towards the socio ecological challenge of the Earth Charter. 20004.
33	Granzin, K.L., and Olsen, J.E.,	:	Charaterizing participants in activities protecting the environment: A focus on donating, recycling and conservation behavior. Journal of Environmental Psychology. 1991.
34	Ghosh, R.C.,	:	Hand Book on Afforestation, Techniques, Published by the Controller of Publications, Delhi, printed at FRI Press, 1977.
35	Guagnano, G.A., Stern, P.C., and Dietz,T.,	:	Influences on attitude-behaviour relationships a natural experiment with curbside recycling. Environment and behavior. 1995.
36	Hini, Dean, Gendall, Philip, and Kearns Zane,	:	The link environmental attitudes and behavior. Marketing Bulletin. 1995.
37	Kyburg-Graber, R., Hofer, Wolfensberger, B.,	:	Studies on a socio- ecological approach to environmental education- a contribution to critical position in the education for sustainable development discourse. 2006.
38	Kaiser, F.G.,	:	A general measure of ecological behaviour. Journal of Applied Social Psychological. 1998.
39	Lieberman, G.A.,	:	Education and the Environment: Creating standards-based programs in schools and Districts. Cambridge, MA: Harverd Education Press. 2013.
40	Lyne, G.D., and Rola, L.R.,	:	Improving Attitude-behaviour prediction models with economic variables: Farmer actions towards soil conservation. Journal of Social Psychology. 1988
41	Levenson, H., :	:	Ecological Knowledge and Preception of Environmental modifiability. American Psychologist. 1974.
42	Lansana, F.M.,	:	Distinguishing Potential recycling from Non-recyclers: A basis for developing recycling strategies. Journal of Environmental Education. 1992.
43	Miller, J.,	:	Working in environment: Skills, Expertise and New opportunities. In Wehrmeyer, W., editor, Green People: human resources and environmental Management. Green leaf Publishing. 1996
44	Metcalf, K.R., Woodall, W.R., Hobson, C.M., And Williams, P.L.,	:	Environmental Performance Measurement: A case study. Environmental Quality Management. 1996.
45	McCarty, J.A., and Shrum,L.J.,	:	The recycling of solid wastes: personal values, value orientations, and attitudes about recycling as antecedents of recycling behavior. Journal of Business Research. 1994.
46	McGuinness, J., Jones, A.P., and Cole, S.G.,	:	Attitudenal Correlates of recycling beheaviour. Journal of Applied Psychology. 1977.
47	Nasrin.,	:	Environmental Education, APH Publishing Co-operation,

5-Ansari Road, Darya Ganj, New Delhi-110002,2004.

48 Newhouse, N., : Implications of attitude and behaviour research for environmental conservation. Journal of Environmental Education. 1990.

49 Nagaland University., : Profile of the Affiliated Colleges, Nagaland University, 2009.

50 Pandey, V.C., : Environmental Education, Isha Books, D-43, Prithviraj Road, Indarsh Nagar, Delhi-110033, 2005.

51 Puran Chand., : Fifth Survey of Educational Research(1988-92), Abstract, Volume-02, NCERT, ShriMargh, New Delhi-110016.

52 Shrivastava, Singh,D.P., : Environment Education, Environment Care and Sustainable Development Society, Jabalpur, Anmol Publications, Pvt.Ltd., New Delhi-110002.

53 Rai, A.N., : A text Book of Environmental Education, Royal Brothers Prakashan, New Delhi, 2009.

54 Singh,I.P., Tiwari, S.C., : Man and His Environment, 1980.

55 Sharma, Y.K., Katoch and Kuldeep,S., : Education for Values, Environment and Human Rights. Deep and Deep Publications Pvt.Ltd., F-159, Rajouri Garden, New Delhi-110021.

56 ShyamNath., : Panorama of North East India, E-35/103, Jawahar Park, Laxmi Nagar, Delhi-110002, 2004.

57 Shrivastava, K.K., : Environmental Education, Principles, Concepts and Management, Kanishka Publishers Distributors, New Delhi-110002.

58 Schahn, J., and Holzer, E., : Studies of Individual environmental concern. The role knowledge, gender and background variables. Environment and Behaviour. 1990.

59 Sharma, B.M., : Teaching Environmental Education, 2006.

60 Smythe, P.C., and Brook, R.C., : Environmental concerns and actions: A social-psychological investigation. Canadian Journal of Behavioural Science. 1980.

61 Sharma, Yogendra,k., : History and Problems of Education, Volume-02, Kanishka Publishers Distributors,New Delhi-110002.

62 Talwar, Prakash,. : Environmental Management, Isha Books, Delhi-110033.

63 Vastava, K.K., : Environmental principles, Concepts and Management, Kausihka Publishers, New Delhi-110002, 2004.

64 Verma, SawaliaBihari., : Environmental Law , Pollution and Management, Bihari University Book House Pvt. Ltd., Jaipur.

65 Woodall, Jr W.R., : Environmental Management System Assessment. In global environmental initiative, editor Arlngton.1994.

66 Wals, A.E., : Convergence between science and environmental education. 2014.

67 Williams, E., : College students and recycling: Their attitudes and behaviours. Journal of College Student Development. 1991.